Claims

What is claimed is:

1. A method of controlling an asymmetric waveform generated as a combination of a plurality of sinusoidal waves including two sinusoidal waves having a frequency that differs by a factor of two, the method comprising the steps of:

sampling the generated asymmetric waveform to obtain a set of data points that is indicative of the generated asymmetric waveform;

normalizing each data point of the set of data points;

determining at least a value relating to the normalized data points;

comparing the determined at least a value to template data relating to an ideal asymmetric waveform; and,

in dependence upon the comparison, effecting a change to the generated asymmetric waveform.

2. A method of controlling an asymmetric waveform generated as a combination of a plurality of sinusoidal waves including two sinusoidal waves having a frequency that differs by a factor of two, the method comprising the steps of:

sampling the generated asymmetric waveform to determine a plurality of data points from a plurality of different cycles of the generated asymmetric waveform, the plurality of data points being indicative of a shape of the generated asymmetric waveform;

analyzing the plurality of data points indicative of a shape of the generated asymmetric waveform, the step of analyzing being performed other than in dependence upon an order of magnitude of the data points; and,

in dependence upon the step of analyzing, effecting a change to the generated asymmetric waveform.

3. A method according to claim 1, wherein the step of determining at least a value relating to the normalized data points is performed other than in dependence upon an order relating to the magnitude of the data points.

4. A method according to any one of claims 1 and 3, wherein the step of sampling is performed as an analog-to-digital sampling for collecting data points contained within one cycle of the generated asymmetric waveform.

5. A method according to any one of claims 1 and 3, wherein the step of sampling is performed as an analog-to-digital sampling, for collecting data points from a plurality of portions of the generated asymmetric waveform during a period of time overlapping with a plurality of different cycles of the generated asymmetric waveform.

6. A method according to any one of claims 1, 3, 4, and 5, wherein each data point includes information relating to a value of V(t) at a time t, where V(t) is the asymmetric waveform voltage as a function of time.

7. A method according to claim 6, wherein the step of determining at least a value relating to the normalized data points includes the steps of:

applying a predetermined function to each normalized data point, to determine a resultant value for each normalized data point; and,

determining one of an average and a sum of the resultant values for each normalized data point.

8. A method according to claim 2, wherein each data point includes information relating to a value of V(t) at a time t, where V(t) is the asymmetric waveform voltage as a function of time.

9. A method according to any one of claims 6, 7, and 8, wherein the time dependent part of the generated asymmetric waveform has the general form $V(t) = A \sin(\omega t) + B \sin(2\omega t - \Theta)$, where A is the amplitude of a first sinusoidal wave at frequency ω, where ω is the frequency in radians/sec, B is the amplitude of a second sinusoidal wave at a frequency 2ω, and Θ is a phase angle offset in radians between the first sinusoidal wave and the second sinusoidal wave.

10. A method according to claim 9, comprising a step prior to the step of sampling the generated asymmetric waveform of setting the value of A+B to a predetermined value.

11. A method according to claim 9, wherein the effected change is for satisfying the condition $\Theta = \pi/2$.

12. A method according to claim 9, wherein the effected change is for satisfying the condition that A/B equals a predetermined value.

13. A method according to claim 7, wherein the predetermined function is one of a monotonic increasing function and a monotonic decreasing function over a range of values including the normalized data points.

14. A method according to claim 7, wherein the first derivative of the predetermined function is one of a monotonic increasing function and a monotonic decreasing function over the range of normalized data points.

15. A method according to claim 7, wherein the predetermined function is an odd function, defined as f(-x) = -f(x).

16. A method according to claim 7, wherein the predetermined function is selected from the group comprising: a cube function; a modified square function; and, a modified exponential function.

17. A method according to any one of claims 1 to 16, wherein the step of effecting a change to the generated asymmetric waveform is performed in an iterative fashion until the generated asymmetric waveform approximates the ideal asymmetric waveform.

18. A method according to claim 7, wherein the predetermined function provides a resultant value that is one of (a) positive for all positive data points and negative for

all negative data points and (b) negative for all positive data points and positive for all negative data points.

19. A method according to claim 18, wherein the resultant value is the same absolute value whether the data point is positive or negative.

20. A method according to claim 2, wherein the frequency of sampling has other than a well defined relation to the frequency of the asymmetric waveform.

21. A storage medium encoded with machine-readable computer program code for controlling an asymmetric waveform generated as a combination of a plurality of sinusoidal waves including two sinusoidal waves having a frequency that differs by a factor of two, the storage medium including instructions for:

obtaining a set of data points that is indicative of the generated asymmetric waveform;

normalizing the data points of the set of data points;

applying a predetermined function to the normalized data points of the set of data points, to determine a set of resultant values including one resultant value corresponding to each normalized data point of the set of normalized data points;

determining at least a value relating to the set of resultant values;

comparing the determined at least a value to template data relating to an ideal asymmetric waveform; and,

in dependence upon the comparison, adjusting at least one of a phase angle difference between the two sinusoidal waves and an amplitude of at least one of the two sinusoidal waves.

22. A storage medium according to claim 21, wherein the instructions for applying a predetermined function to the normalized data points of the set of data points includes instructions for applying the predetermined function other than in dependence upon an order relating to the magnitude of the data points of the set of data points.